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Assessing the Impacts of Technology Business Incubators: A framework for Technology Development Centers in Turkey

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Abstract

Entrepreneurship and innovation have been widely accepted as essential sources of business success, high value added job creation and national economic development. A wide array of mechanisms is being promoted to support innovative entrepreneurship. Among these mechanisms business incubators and related enterprise support systems have emerged worldwide as highly popular methods for promotion of economic development not only in industrialized countries but also industrializing and restructuring countries, although the discussions have been continuing about their impact or performance. Many researches have been conducted to assess their performance or impact. However these researches generally use similar indicators to assess the performance of business incubators both in developed and developing world. This study will review the related works on the performance of business incubators as an SME support tool and also its relevance for Turkey with a special focus on the assessment of the performance of the incubators for the case of Turkey. We will try to add draw a framework to assess the Technology Business Incubators in Turkey on the basis of the development stages concept.

Keywords: Entrepreneurship, Innovation, Business Incubators and Technology Development Centers

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1. Introduction

Since the seminal works of Birch (1979, 1987) that provide evidence about the impact of new and small firms on creating new jobs in USA, small businesses have been increasingly viewed as the primary sources of job creation and critical to economic development. Considerable amount of researches have been conducted all over the world generating evidence that support the argument that small businesses, particularly the high growth small businesses create most of the jobs and wealth (Stokes&Wilson 2010, Thurik&Wenneker 1999). Yet researches also demonstrate that despite their positive impact on economy, these small and new businesses are very fragile and vulnerable especially during their first years. Majority of those fails soon after being started and only a small proportion of survivals are succeed to growth (Stokes&Wilson 2010).

In line with the acknowledgement of their fragility as well as significance, the efforts to create more conducive environment for new ventures have increased substantially and several forms of government incentives and business

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assistance mechanisms provide them necessary support in order to improve their survivability has emerged and proliferated all over the world (Autio&Klofsten 1998, Udell 1990, Ratinho 2011, Amezcua 2010b).

Among a broad array of mechanisms, programs and incentives, Business Incubators have been particularly receiving an increasing interest as a tool to promote new business formation, prevent business failures and establish a vibrant entrepreneurship sector not only in developed countries but also developing and less-developed countries in recent years (Bergek&Norrman 2008,Scillitoe&Chakrabarti 2010, Bruneel et al. 2012, Schwartz&Gothner 2009, Udell 1990, Aerts et al. 2007, Allen&Rahman 1985, Gribaldi&Grandi 2005, OECD 1997, Ratinho et al. 2010). Thus, the number of Business Incubators has been rising rapidly around the world as an evidence of the importance attributed to the Business Incubators (Udell 1990, Ratinho 2011, Ratinho&Henriques 2010, OECD 1997, EC 2002 Schwartz&Gothner 2009) Many governments has been devoting considerable amount of resources to establish and operate business incubators. Considerable amount of researches have been conducted on the performance of Business Incubation programs for a decade due to this increasing interest (Aernoudt 2004). Generally similar measures have been used in these researches related to a wide array of countries ranging from most developed to less developed countries. However according to Porter's categorisation there are considerable differences between countries (Acs&Szerb 2010). Therefore the measures should be different when assessing the success of Business Incubators.

In this study we will try to find out and present some more appropriate measures with reference to the unique features of Turkey's development stage as Porter emphasized, so as to understand better how incubator program can be assessed better. With a special focus on the development stages the measures used worldwide in the researches assess the performance of the incubators will be reviewed and a framework for assessing the TEKMER program will be provided.

2. Literature Review

The literature on Business Incubators has been substantially developing due to growing popularity of new business formation as a means of economic development and job creation for approximately three decades (Phan et al. 2005, Hackett&Dilts 2004, Tamasy 2007). We will provide concise information on Business Incubation concept and empirical researches on the performance of incubators as an SME support tool. Moreover precise information on the development stages theory will be provided.

2.1 Business Incubation Concept

There is no one standard definition and type of business incubation. Although the Business Incubator concept started as resource sharing initiatives, their roles, characteristics has evolved and become an important tool offering many services like training, consulting and networking (Peters et al. 2004).Currently many definitions and types are available in the literature that reflects the aspects of the national policies and local cultures and covers wide range of services, approaches and objectives (Hamdani 2006, Ratinho&Henriques 2010, Chandra 2007, Bollingtoft&Ulhoi 2005). Thus, Aernoudt (2004) describes the term incubator as an umbrella concept which covers a heterogeneous group of institutions. There has been some studies aiming to classify Business Incubators Business Incubators have been differentiated along various dimensions like; purpose (Bollingtoft&Ulhoi 2005), ownership structure-whether they are privately or publicly owned (Grimaldi &Grandi 2005), service portfolio and management features (Aerts et al. 2007).

However one common characteristic shared by all definitions is that Business Incubators are facilities designed to create conducive environment to new and small ventures in order to help them to cope with the difficulties existed in the initial stages, survive and grow and become successful mature businesses. Business Incubators' services may vary, however basic services can be count as physical space at subsidized rates, shared basic business services and equipment at little or no cost, business assistance, legal and technical advises and financial supports (Bruneel et al. 2012, Amezcua 2010b, Bergek&Norrman 2008, Chandra 2007, Ratinho et al. 2010, Bollingtoft&Ulhoi 2005, Ratinho&Henriques 2010, OECD 1997, EC 2002, Allen&Rahman 1985, Smilor&Gill 1986, Aernoudt 2004, Hackett&Dilts 2004, Grimaldi&Grandi 2005). These services mainly can be gathered under three dimensions: Infrastructure that covers localities, office facilities and administrative services, Business Support that is associated with counselling/training activities undertaken to develop the tenant firms and Mediation refers to how the incubator

connects the tenant firms to each other and to the outside world. (Bergek&Norrman 2008, Schwartz&Gothner 2009, Grimaldi&Grandi 2005, Aerts et al. 2007, Chan&Lau 2005). In the incubator literature, the relative emphasis on each component has varied over time, from an initial focus on facilities and administrative services to a more recent emphasis on the importance of business support (Bergek&Norrman 2008). From these three types of services and supports provided by Business Incubators the significance of business supports like training and consultancy has been increasingly emphasized by the researchers recently (Bollingtoft&Ulhoi 2005, Chan&Lau 2005).

2.2. Assessing the Business Incubation Programs

With the increasing interest towards the Business Incubation, the debates on the benefits, effectiveness, success as well as the economic and social contributions of the Business Incubators have also received considerable attention from the researchers and policy-makers (Bergek&Norrman 2008). Many empirical studies have been applied to assess the Business Incubators. All of these researches tend to reflect different perspectives, patterns and assessment criteria in the literature which are focused on measuring performance of Business Incubators throughout the world (Phan et al. 2005). Literature suggests for business incubation success to be measured at multiple levels, more especially at the incubator related and firm level related impacts (Hamdani 2006). There are a variety of measures of incubation performance or outcomes such as occupancy rate, added value of incubator service, the number or proportion of firms graduated, growth of the tenant firms, jobs and wealth created (Phan et al. 2005, Chan&Lau 2005, Hackett & Dilts 2008) number of patent applications per firm (Colomba&Delmastro 2002).

From a general perspective the primary function of Business Incubators is to help new established firms to survive and assist in the development and growth of existing companies (Allen&Rahman 1985). However, although survivability of new businesses are often used as a measure to assess the performance of Business Incubators many researchers argue that it should be accepted as a necessary but insufficient condition for success and emphasize the significance of the extent to which Business Incubators contribute to the growth of firms and creation of jobs (European Commission 2002, Aerts et al. 2007).

In the literature survival measures has been widely used as indicators of incubator performance, since the promotion of survivability of tenant and graduate companies is one of the primary Business Incubators' objectives (Adegbite 2001, Allen& Rahman 1985, Schwartz&Gothner 2009). In one of the early researches Allen and Rahman (1985) demonstrated that %87 of the entrepreneurs stated that they would have started their business without the incubator. Mian (1994) focused on a sample comprising three state university-sponsored and three private university and explored the university based business incubators' performance based on some key dimensions like organizational design, tenant performance review, funding sources, targeted technologies, strategic operational policies, services and their value-added component, and growth of the client firms. In another study Mian (1996) conducted a case study of two university incubators in University of North Carolina and Case Western Reserve to test the value added contributions found that Sales of firms increase by about 10 and employment by 4 times within four years. In a study of four US incubators, Mian (1997) found that the majority of affiliated firms exhibited sales and employment growth

Colombo and Delmastro (2002) in their study compared 43 Italian firms located on technology incubator with a control sample of off incubator firms similar in age, sector, and geography. They found that on- incubator firms exhibited higher job growth while the results confirmed that there is only a marginal difference in innovative activity aspect of on-incubator and off-incubator firms. Abetti (2004) conducted a research with a sample of 5 incubators among 16 incubators in Finland found that Business Incubators has a positive impact on new venture creation, job creation, cost effectiveness, growth and regional unemployment. The survival rates of the incubator firms reach to 95% and incubators are able to create high-skilled cost effective jobs receive little funding from the government but

Rothaermel and Thursby (2005) showed that incubated firms holding a university technology license were significantly less likely to fail. Aerts et al. (2007) argued that incubators who screen against a balanced set of indicators will have lower failure rates. However, there is also contradictory evidence that suggests incubators have little or no effect on the success of ventures in terms of survival (Tamasy 2007). Chen's (2009) study of Taiwanese incubators found no direct effect on new venture performance as a result of incubation. Ratinho and Henriques (2010) argued that although Business Incubators are widely accepted as an effective tool for economic growth, the contribution is not significant in Portugal context. There is very low impact on company creation. Their contribution

to job creation and economic growth is not considerable. Even some researches argue that this same process can weaken a firm's ability to compete and survive when graduating out of the incubator (Amezcua 2010a).

Akcomak and Taymaz (2007) demonstrate that there are differences between on and off-incubator firms in terms of sales and employment. However, Lindelof and Lofsten (2002) discovered no difference in profitability between on- and off-park firms, but the off-park sample had significantly lower growth in employment and sales turnover. In a study of 114 firms in Spain, Pena (2004) investigated the relationship between firm growth and incubation specific factors.

2.3 The Development Stages and the measures used to assess the Business Incubation Programs

One of the major problems in assessing the impact of the Business incubators is that although there is vast amount of empirical studies on the performance of business incubators, there is still lack of consensus on the measurement of the performance of Business Incubation. There is no single standard method to measure the performance which makes it complicated to measure the incubation performance and make comparisons (Ratinho&Henriques 2010, Bergek&Norrman 2008, Schwartz&Gothner 2009, Phan et al. 2005).

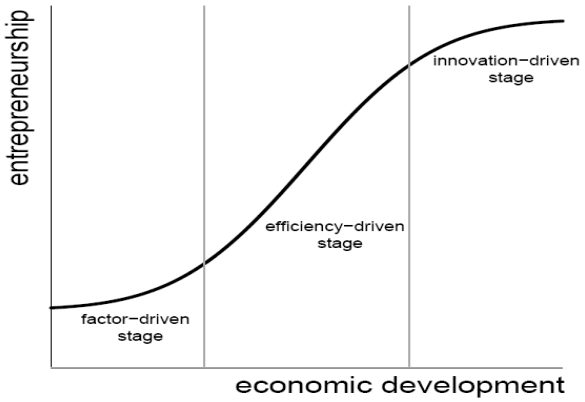
Second problem is that most of the researches on business incubators are conducted in developed countries. There are only few researches that quantitatively evaluate incubator performance in developing countries (Akçomak and Taymaz, 2007). However Acs and Naude (2011) argue that the government policies must explicitly be incorporated to the role of entrepreneur and the developmental stage of a country. The role of the entrepreneur differs across stages of development. Understanding the nature of the firm as described should be seen in conjunction with the advances in recent years of distinguishing the role of entrepreneurship across various stages of development developed on the basis of Porter's categorisation. Porter identified three stages of development following recent developments in the economics of innovation: (Acs&Szerb 2010)

(1) a factor-driven stage that is marked by high rates of agricultural self-employment, small manufacturing and service firms are generally sole proprietorships firms. Countries in this stage compete through low-cost efficiencies in the production of commodities or low value-added products. Knowledge creation for innovation is very limited.

(2) an efficiency-driven stage is marked by decreasing rates of self-employment. Capital and labor play a crucial role in productivity and the focus is on technology, in the decision making process. Countries must increase their production efficiency and educate the workforce to be able to adapt in the subsequent technological development phase. Countries must have efficient productive practices in large markets, which allow companies to exploit economies of scale. Industries in this stage are manufacturers that provide basic goods and services.

And (3) an innovation-driven stage is marked by an increase in knowledge-intensive activities. Knowledge provides the key input. The innovation-driven stage is biased towards high value added industries in which entrepreneurial activity is important.

Figure 1 : Development Stages



Source: Acs&Szerb (2010)

Acs and Naude (2011) also argued that innovation and entrepreneurship as the fundamental drivers of economic growth makes a different contribution across stages and different kinds of policies, supports from they are required at different stages of the economic development. The Technology business incubator programs are the components of innovation and entrepreneurship policies of the countries. These policies should be closely aligned with stages of the development. The discussion so far suggests very strongly that there is no 'one size fits'.

3. Technology Business Incubators in Turkey

With the increasing awareness in Turkey that innovation and entrepreneurship have become the prime drivers of economic growth, some measures have outlined to deepen science and technology policies in order to establish an innovation-based economy. Promoting interactions and co-operations between the research community and the business sector has been given increasing importance in the science and technology policies of Turkey since the 1990s (OECD 2010). The efforts to improve business environment creation, survival and growth of the technology based start-ups and promote the commercialization of R&D results were given birth to the Technology Business Incubator (TBI) system in Turkey which is named as Technology Developmnet Centers (TEKMERs). This program was initiated by KOSGEB- a governmental body affiliated with Ministry of Science, Technology and Industry. KOSGEB has taken a proactive approach and established 28 TEKMERs in every part of the Turkey. In the framework of this program KOSGEB not only provide working offices to the entrepreneurs but also support them with various financial instruments.

Since then TEKMERs have become an important policy tool for helping new technology-based firms increase their chances of survival and generate wealth and jobs (Mittelstadt &Cerri 2008, www.kosgeb.gov.tr). The principal purpose of the TEKMERs is to help entrepreneurs successfully implement and commercialize their products, improve their conditions and enhance their competitive capacity. TEKMERs carry out the following functions; (www.kosgeb.gov.tr)

Activities related to the reinforcement of R&D functions in SMEs
Establishment of technology oriented enterprises
Extension of the production and utilization of advanced technologies in SMEs
Transferring the existing technological information to SMEs
Developing the necessary mechanisms of R&D incentives for SMEs

TEKMERs often affiliated to a technical university provides a platform for convergence required scientific and technical resources as well as commercialize the R&D results. They have been established through protocols signed between KOSGEB and universities and chambers of commerce. They service both start-ups and existing innovative SMEs. (Mittelstadt &Cerri 2008)

To accomplish these objectives; TEKMERs provide a range of services to entrepreneurs and start-ups including office space with shared office services, consultancy services (technical, administrative and manegerial), tarining, access to university facilities, access to financing and networking. Additionally entrepreneurs and start-ups can benefit from the financial supports offered to technology start-ups by KOSGEB. (www.kosgeb.gov.tr)

It can be easily argued that there is a gap in the researches on TEKMERs in Turkey. The only study to investigate the performance of these initiatives was carried out by Akcomak and Taymaz (2007). In this study the effectiveness of the TEKMERs are searched on the basis of their value added contribution to tenant firms during incubation period by comparing on and off-incubator firms. The framework used for the assessment of TEKMERs is more or less similar with the other researches have carried out in the developed world. However we believe that a different framework should be applied to the researches focused on the impact of TEKMERs on entrepreneurship, new venture creation and innovation.

4. Methodology

This study is an attempt to create an assessment framework for TEKMERs which may be more appropriate to evaluate the success of those. Of course the universal knowledge will be taken into consideration in the study but some special determinants will be added in order to reflect the particular situation in Turkey. The study will review the

related works on the incubators as an SME support tool and also its relevance for Turkey with a special focus on the assessment of the performance of the incubators worldwide and for the case of Turkey.

Within the context of this study the literature on the performance of incubators in developed and developing countries will be reviewed and the fact that the measures for assessing business incubator effectiveness as a business development mechanism should be adapted to country needs will be illustrated. We will establish our argument on the development stages theory.

Innovation, job creation, and economic growth are accepted as the main measures for university-based business incubators in mainstream literature (Table 1).

Table 1: Summary of measures used to assess the performance of incubators (Adopted from Dee at all. 2012)

Measures	Study and Year	Country
Tenant firms' survivability	Allen and McCluskey 1990, Mian 1997,European Commission 2002, Rothaermel and Thursby 2005 Shefer and Frenkel 2002, Abetti 2004 Avnimelech et al. 2007	USA, EU, Israel, Finland
Tenant firms' sales growth (%)	Mian 1997 Lindelof and Lofsten 2002, Amezcua (2010), European Commission (2002), Chen (2009), Philips 2002 Abetti 2004 Ratinho and Henriques 2010 Akcomak and Taymaz 2007 Pena 2004	Sweden, Finland, Portugal, Turkey, Spain
Tenant firms' employment growth (%)	Mian 1997, Udell 1990, Colombo et al. 2002Lindelof and Lofsten 2002, Amezcua (2010), European Commission (2002), Abetti 2004,Ratinho and Henriques 2010 Akcomak and Taymaz 2007 Pena 2004	Sweden, Finland, Portugal, Turkey, Spain
Tenant firms' profit growth (%)	Lindelof and Lofsten 2002, Chen (2009) Pena 2004	Sweden, Spain, Taiwan
Tenant firms finance raised ($)	Colombo et al. 2002	Italy
Tenant firms' taxes growth (%)	Mian 1997	USA
Tenant firms' export growth (%)	Mian 1997	USA
Tenant firms number of copyrights	Colombo et al. 2002,	Italy

As it can be seen from the table the researches on the business incubation effectiveness have been mainly conducted in countries that are innovation driven stage. However for the countries that are in efficiency driven or transition stage including Turkey, different assessment measures should be used. We will try to find out and present some more significant measures with reference to the unique features of TEKMERs so as to understand better how incubator program can be assessed in a developing country. We believe the assessment framework offer an alternative perspective in the analysis of technology incubators and may be applied to other developing countries. This study will also be beneficial to reviews the extent literature examines the critical role that TEKMERs can play and identify some implications for policy makers.

5. Discussion: Development Stages and Assessing the Performance of TEKMERs in Turkey

Turkey is one of the countries that also followed this trend and started a Technology-oriented Business Incubator (TBI) program in 1990s in the coordination and management of Small and Medium Sized Enterprise Development Organisation (KOSGEB) of Turkey (Akçomak&Taymaz 2007). Currently there are 28 TBIs which is called as

Technology Development Centers (TEKMER) in Turkey (www.kosgeb.gov.tr). Since the first TEKMER established in Ankara only a few studies have been conducted to assess the performance or impact of those. There are some discussions about the impact of TEKMERS in Turkey although it is relatively new concept in Turkey. TEKMERs in Turkey provide physical infrastructure and a wide range of supports and services to start-ups and entrepreneurs to help them increase their chances of surviving in the early stages of development. The main objective has been and still is, to nurture entrepreneurial start-ups, that will grow rapidly, create wealth and employment and contribute to local and regional economic development. (www.kosgeb.gov.tr)

It is often difficult to determine the economic impacts of a TEKMER program mainly because of the number and complexity of the variables involved and lack of established and accepted single model to evaluate the impact of TBIs. The benefits and costs associated with such programs are subject to debate in theory and practice. Incubator evaluations can be approached from different perspectives (Chan, et.al 2005).

There is only few researches on the performance of TEKMERs in Turkey. The study of Akçomak and Taymaz (2007) is one of them. In this study, the performance of technology incubators in Turkey are analyzed, by comparing 48 on-incubator firms with 41 off-incubator firms. They found that that the economic performance of on-incubator firms outperforms comparable firms located off-park. But as regards the innovative performance, no big differences were found in these two categories.They also claim that, surprisingly, the business networking and interaction with universities are not strong as they should be.Main findings of Akçomak and Taymaz are summarized below in Table 1.

Table 2. Main Findings of Akçomak and Taymaz,
Source: Akçomak and Taymaz, 2007

Issue	Findings
Economic Performance	On-incubator firms seem to perform better in terms of employment growth and output growth.
Innovative Output	The data does not support the hypothesis that on-firms perform better than off-firms regarding new product and service development.
Interaction with similar businesses and universities	Importance of networking with similar businesses does not differ between on- and off incubator firms. But incubator firms are better linked to universities.
Information networks and financial supports	Being in an incubator does not affect opportunities to access financial support but Incubators may help the firms on this process.
Entrepreneurs	On-incubator firms appear to be slightly better educated. More than %95 of the on-incubator firm entrepreneurs are either engineer or hold a science degree, which is significantly more than off-incubator firms.
Overall Evaluation	Technology incubators in Turkey have quite important role in supporting start-ups in their vulnerable stages. 60% of the firms found the services provided critical to firms' development.

Akçomak and Taymaz (2007) mainly focused on the impact of incubation period on Businesses. The framework used for the assessment of TEKMERs is more or less similar with the other researches have carried out in the developed world. However we believe that a different framework should be applied to the researches focused on the impact of TEKMERs on entrepreneurship, new venture creation and innovation. The assessments on the performance of the business incubators should take the stages of development of the countries into account in order to make an effective and fair evaluation. A business incubator in USA or other developed countries should have differentiated missions and so performance criteria from those in developing or underdeveloped countries. In developing countries, incubators tend to present specific features and challenges which are linked to the status of the local economic and financial environments. There are differences that may exist from country to country (Scaramuzzi, 2002).

TEKMERs has significant impacts on not only to achieve national objectives such as job creation, growth and regional development but also the start-up's performances (Cansiz 2008, Akcomak 2011). Akcomak and Taymaz (2007) demonstrate that on-incubator firms seem to display better records both in terms of employment growth, sales revenue and growth compared to those that are established out of the TEKMERs.

The most important advantage of the TEKMERs lies in their ability to assist with high-risk during their initial stages where they are in the most vulnerable stages. TEKMERs support projects during the early R&D stages when private sector generally reluctant to invest. They encourage the entrepreneurs to take risks and iniate their project by providing a suitable environment and reducing the early stage costs (Akçomak&Taymaz 2007). According to the OECD (2010) %37 of the TEKMERs tenant firms are new firms and the survival rate of these start-ups are very high when compared with the other technology based firms (Akçomak&Taymaz 2007). One important argument is that the innovativeness of the TEKMER tenant firms is very low (Akçomak&Taymaz 2007). However this is closely related with the stage of the Turkey at the development path. Since Turkey is still be considered within the group of countries transition to innovation driven stage, perhaps the evaluation should be based on the extent of developing the high technology value added products in Turkey that promote import substitution of high-tech parts and components. The related socio-economic benefits stemming from import substitution may be assessed by the decrease in the high technology import levels.

TEKMERs have multiple purposes and stated goals of an incubator differ from pure economic development.TEKMERs not only promote economic and business interest can also play an important role in strengthening co-operation between public and private actors in regional economic development. The findings show that important parts of the labor force of on-incubator firms are graduates and student employees from the university that the firm is located in. To be significant from a local perspective it is relevant to note that firms graduating from incubators frequently locate in the vicinity of the incubator (Akcomak 2011). They provide part time employment opportunities to the university students, help them to gain experience and serve as a model for young entrepreneurs. TEKMERs are providing for training opportunities for students and as commercial outlets for faculty research. Clark and Czuchry (2004) argue that TBIs can be considered as living laboratories experiential learning through group and field projects and case studies technology-based business incubators can play an important role in innovative entrepreneurship education. but they also provide students with the opportunity to consult with these dynamic businesses to gain considerable practical knowledge of what is required to make a technology start-up venture successful. Moreover cross-functional teams provide the opportunity for students to gain a perspective for the value of each other's expertise. In addition, team based learning experiences helps prepare students for the challenge of managing businesses with rapidly changing technologies.Furthermore they encourage the university spinoffs and promote transfer of knowledge from the academy to industry very successfully. For instance %69 of the start-ups are spinoffs from academy in one of the TEKMERs located in Ankara (OECD 2010).

Another advantage of the TEKMERs is that they provide a ground for networking among firms and also with the universities. There are researches supports the idea that the networking in the business incubators positively influence the success of the start-ups. Tenant firms in incubators generally network to access resources and to acquire knowledge (Ratinho&Henriques 2010, Akcomak 2011, Schwartz & Hornych 2010). Although research show that on-incubator firms have better interaction and networking channels with other businesses, and university, the interaction is still very low in TEKMERs. There are mainly two reasons; first reason is about the perceptions of entrepreneurs. The entrepreneurs do not consider networking as an essential strategy. Only a tiny proportion of the on-incubator firms see networking as a significant strategic tool (Akcomak & Taymaz 2007). And second reason is mainly about business confidentiality. The entrepreneurs deliberately chose not to network with other firms in order to protect their critical information and personnel (Akcomak 2011). Moreover, the financial networks are not developed in TEKMERs, so the financial sources like business angel, venture capital which are very important for success are inadequate. So communication and networking relationships especially among tenant firms and between tenant firms and financial resources and university should be encouraged.

According to our literature review it can be stated that there is a general tendency to focus on some economic indicators as number of jobs created; the number of graduate firms generated and their survival rates; increased sales and profits of tenant firms; incubator's revenue and sustainability over time and taxes paid by tenant firms. If the incubator is a technology business incubator or university based incubator then there is also an interested in knowing the number of technologies commercialized through a new incubated company or number of patents.

6. Conclusion

Business incubation has been acknowledged as an effective support infrastructure for SME and entrepreneurship in many countries. Systematic evaluations are needed to understand whether business incubation is an effective are effective and efficient policy tools in those countries.

An incubator's objectives can differ depending on its mission and operating structure, all small business incubators aim to support start-up firms during their vulnerable early years and to enable tenants to graduate from the program as viable companies capable of operating independently (Hall, 2007). While many incubators still aim to fuel job creation, additional objectives include enhancing regional economic competitiveness, fostering innovation, and creating a more entrepreneurial environment in the community (Aernoudt 2004). In developing countries as Turkey, this should preferably be conducted in broad terms, in order to consider incubators as part of an often 'challenging' private sector environment. In developing countries, incubators tend to present specific features and challenges which are linked to the status of the local economic and financial environments. There are differences that may exist from country to country (Scaramuzzi, 2002).

In evaluating the TEKMER performance in Turkey the development stage of the country should be taken into consideration. Measures like job creation, graduation rates or the growth performance of the tenant firms can be taken as indicators. However considering the countries specific conditions innovation should not be measured on radical basis. The number of patents or the R&D capacity may be low in the tenant firms. These indicators are closely related with the development stage of the country. In turkey while assessing the performance of incubators the import-substitution effect of TEKMERs in the high-tech products and services may be taken into consideration. Moreover their contribution to the entrepreneurial and technical education should be taken into consideration as an important fact.

7. Future Research

Business incubator programs have become a central element of support infrastructure for SME and entrepreneurship. These programs exist widespread worldwide as a popular entrepreneurship policy intended to help new businesses avoid the risks of failure and generate economic growth in worldwide (Amazcua 2010a). They receive tremendous subsidies from governments and a great deal of government funds is directed to them both in developing and developed countries. However, the researches dealing with whether incubators impact on business performance, economic growth and benefits to society.

This study on discussing the assessment framework of Business Incubator programs can only be the first step towards rigorous evaluation efforts. It is useful to go more into the details of Business incubators performance data and investigate the relation between the several performance measures (EC 2002). Part time employment opportunities provided to the university students in tenant firms certainly deserve further research. One other topic might be the high-tech export substitution effect of Business Incubator program.

References

Abetti, P. A. (2004) 'Government-supported incubators in the Helsinki Region, Finland: infrastructure, results, and best practices' *Journal of Technology Transfer* 29:19-40.

Acs, Z. and Naude, V. (2011) 'Entrepreneurship, Stages of Development, and Industrialization' UNU-WIDER Working Paper no: 2011/80

Acs, Z. and Szerb, L. (2010) 'The global entrepreneurship and development index' DRUID Summer Conference 2010.

Adegbite, O. (2001) 'Business incubators and small enterprise development: the Nigerian experience' *Small Business Economics* 17: 157–166.

Aernoudt, R. (2004) 'Incubators: tool for entrepreneurship?' *Small Business Economics* 23(2), 127-135.

Aerts, K., Matthyssens, P. and Vandenbempt, K. (2007) 'Critical role and screening practices of European business incubators' *Technovation* 27(5), 254-267.

Akcomak, I.S. and Taymaz, E. (2007) 'Assessing the effectiveness of incubators: the case of Turkey' in Venkata Ramani, V. and Bala Krishna, A. V. (eds.), *Business Incubation: An Introduction,* Icfai Books, Icfai University Press: Hyderabad, pp. 234-265.

Akçomak, I. S. (2011) 'Incubators as tool for entrepreneurship promotion in developing economies' in: Szirmai, A, Naude, W. and Goedhuys, M. (eds.), *Entrepreneurship, Innovation and Economic Development*, Oxford University Press, Oxford

Allen, D. N. and Rahman S. (1985) 'Small business incubators: a positive environment for entrepreneurship' *Journal of Small Business Management* 23(3):12-22.

Amezcua, A. S. (2010a) 'Performance analysis of entrepreneurship policy: which business incubators generate the highest levels of economic performance?' *Frontiers of Entrepreneurship Research* 3(18): Article 1.

Amezcua, A. S. (2010b) 'Boon or boondoggle? business incubation as entrepreneurship policy' Whitman School of Management, Syracuse University. Available at http://www.whitman.syr.edu/Pdfs/amezcuaboonorboondoggle.pdf.

Autio E. and Klofsten M. (1998) 'A comparative study of two European business incubators' *Journal of Small Business Management* 36(1), 30-43.

Bergek, A. and Norrman, C. (2008) 'Incubator best practice: A framework' *Technovation, 28*(1-2), 20-28.

Bollingtoft, A. and Ulhoi, J. P. (2005) 'The networked business incubator--leveraging entrepreneurial agency?' *Journal of Business Venturing* 20 (2): 265-290.

Bruneel, J., Ratinho, T., Clarysse, B. and Groen, A. (2012) 'The evolution of business incubators: comparing demand and supply of business incubation services across different incubator generations.' *Technovation* 32 (2): 110-121.

Cansiz, M. (2008) Türkiye'de KOBIler ve KOSGEB DPT Uzmanlık Tezi Ankara: DPT

Chan K.F. and Lau T. (2005) 'Technology incubator programs in the science park: the good, the bad and the ugly' *Technovation* 25(10): 1215–1228.

Chandra, A. (2007) 'Approaches to business incubation: a comparative study of the United States, China and Brazil' *Business Strategy Review* 10(3):1-42.

Chen, C.J. (2009) 'Technology commercialisation, incubator and venture capital, and new venture performance' *Journal of Business Research* 62: 93-103.

Clark, W. A. and Czuchry A. J. (2004) 'Technology-Based Business Incubators: Living Laboratories for Entrepreneurial Students' American Society for Engineering Education Annual Conference & Exposition.

Colombo, M. G. and Delmastro, M. (2002) 'How effective are technology business incubators: evidence from Italy" *Research Policy* 31: 1103-1122

Dee N. J., Livesey F., Gill D. and Minshall T. (2011) Incubation for Growth : A review of the impact of business incubation on new ventures with high growth, Nesta Report

European Commission (2002) 'Benchmarking of business incubators' European Commission, Enterprise Directorate General, Brussels.

Grimaldia, R., Grandia A. (2005) 'Business incubators and new venture creation: an assessment of incubating models' *Technovation* 25(2): 111–121

Hall, E. (2007) "Measuring the Economic impact of a nonprofit small business kitchen incubator: a case study of nuestra culinary ventures" Urban Studies Program Senior Seminal Papers, University of Pennsylvania

Hamdani, D. (2006) 'Working paper on conceptualizing and measuring business incubation' *Science, Innovation and Electronic Information Division (SIEID) Working Paper*

Hackett, S.M. and Dilts, D.M. (2004) 'A systematic review of business incubation research' *Journal of Technology Transfer* 29: 55-82.

Hackett, S.M. and Dilts D.M. (2008) "Inside the black box of business incubation: Study B—scale assessment, model refinement, and incubation outcomes' *The Journal of Technology Transfer* 33(5) : 439-471

Lindelof, P. and Lofsten, H. (2002) 'Growth, management and financing of new technology-based firms – assessing value-added contributions of firms located on and off Science Parks' *Omega* 30: 143-154.

Mian, S.A (1994) 'U.S. university-sponsored technology incubators: An overview of management, policies and performance' *Technovation* 14(8): 515-528.

Mian, S. A. (1996a) Assessing value-added contributions of university technology business incubators to tenant firms. 'Research Policy.' 25: 325-335.

Mian, S.A. (1996b) 'The university business incubator: a strategy for developing new research/technology- based firms" *The Journal of High Technology Management Research*, 7 (2), 191-208.

Mian, S. A. (1997) 'Assessing and managing the university technology business incubator: an integrative framework' *Journal of Business Venturing* 12: 251-285.

Mittelstadt, A. and Cerri F. (2008) 'Fostering Entrepreneurship for Innovation', OECD STI Working Paper 2008/5

OECD (1997) Technology Incubators: Nurturing Small Firms Paris: OECD Publishing

OECD (2010) SMEs Entrepreneurship and Innovation Paris: OECD Publishing

Pena, I. (2004) 'Business incubation centers and new firm growth in the Basque country' *Small Business Economics*, 22 (3-4) : 223-236.

Peters, L., M. Rice and M. Sundararajan (2004) 'The role of incubators in the entrepreneurial process' *Journal of Technology Transfer* 29(1): 83-91

Ratinho, T., Harms, R., Groen, A. (2010) 'Are Business Incubators helping? the role of Business Incubators in facilitating tenants' development' Paper present at the Academy of Management Annual Meeting, Montréal, Québec, Canada, August 6-11, 2010

Ratinho, T., Henriques, E. (2010) 'The role of science parks and business incubators in converging countries: The Portuguese case' *Technovation* 30 (4):278–290

Rice, M. P. (2002) 'Co-production of business assistance in business incubators: An exploratory study' *Journal of Business Venturing* 17: 163-187

Rothaermel, F. T. and Thursby, M. (2005) 'Incubator firm failure or graduation? The role of university linkages' *Research policy* 34: 1076-1090

Scaramuzzi, E. (2002) 'Incubators in developing countries:status and development perspectives' The World Bank, Washington DC

Schwartz, M. and Hornych, C. (2008) 'Specialization as strategy for business incubators: An assessment of the Central German Multimedia Center' *Technovation* 28 (7):436-449

Schwartz, M. (2010) 'Beyond incubation: an analysis of firm survival and exit dynamics in the post-graduation period' *Journal of Technology Transfer* 34: 403-421.

Schwartz, M. and Hornych C. (2010) 'Cooperation patterns of incubator firms and the impact of incubator specialization: Empirical evidence from Germany' *Technovation* 30(9/10): 485–495

Scillitoe, J.L. and Chakrabarti, A.K. (2010) 'The role of incubator interactions in assisting new ventures' *Technovation*, 30(3):155-167

Smilor, R.W. and Gill, M.D. (1986) '*The New Business Incubator. Linking Talent, Technology, Capital, and Know-How'* Lexington Books, Massachusetts, Toronto.

Stokes, D and N.Wilson (2010) '*Small Business Management and Entrepreneurship'* (6th ed), Andover, Cengage

Tamasy, C. (2007) 'Rethinking technology-oriented business incubators: developing a robust policy instrument for entrepreneurship, innovation, and regional development?' *Growth and Change* 38(3):460-473

Udell, G. G. (1990) 'Are business incubators really creating new jobs by creating new businesses and new products' *Journal of Product Innovation Management* 7: 108–122

Wennekers, S. and R. Thurik (1999) 'Linking entrepreneurship and economic growth' *Small Business Economics* 13(1): 27-55

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